Started on	Saturday, 22 February 2020, 4:25 PM
State	Finished
Completed on	Saturday, 22 February 2020, 4:31 PM
Time taken	6 mins 13 secs
Marks	32.00/32.00
Grade	**100.00** out of 100.00

Question **1**

Correct

Mark 1.00 out of 1.00

Which sequence correctly summarizes how evolution by natural selection works. The arrows can be read as "influence" or "influences".

Select one:

- a. Genes --> Proteins --> Phenotype --> Fitness --> Selection --> Evolution ✔
- b. Genes --> Proteins --> Genotype --> Selection --> Fitness --> Evolution
- c. Proteins --> Genes --> Phenotype --> Fitness --> Selection --> Evolution
- d. Phenotype --> Fitness --> Selection --> Proteins --> Genes --> Evolution
- e. Genes --> Fitness --> Proteins --> Phenotype --> Selection --> Evolution

Your answer is correct.

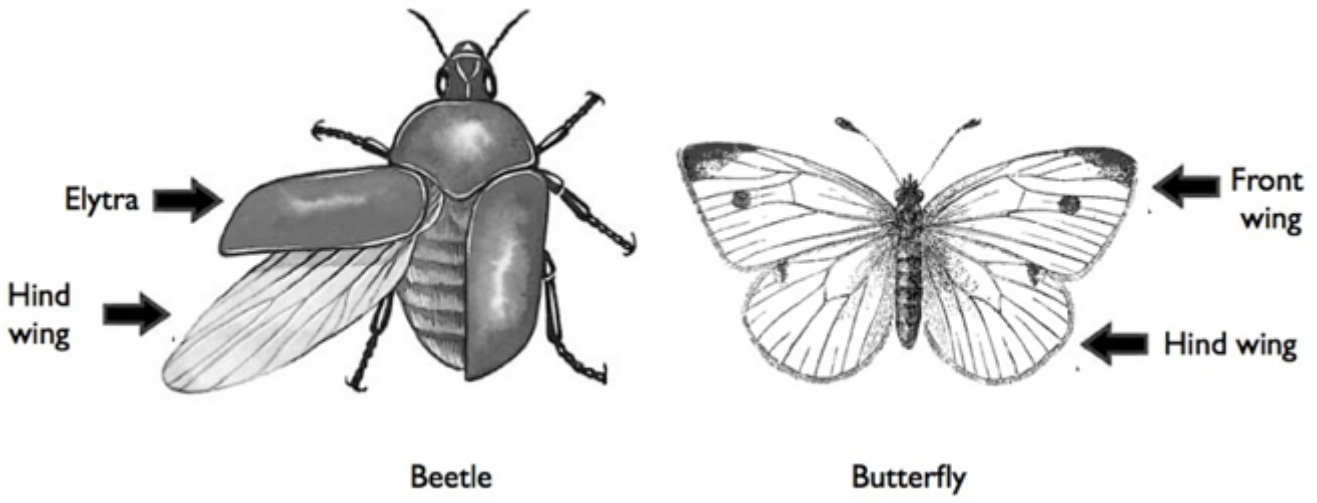
The correct answer is: Genes --> Proteins --> Phenotype --> Fitness --> Selection --> Evolution

Question **2**

Correct

Mark 1.00 out of 1.00

Most insects have two pairs of wings. Beetles are an exception and possess only one pair of functional flying wings: the hind wings (see figure below). During embryonic development the front wings of beetles developed into hard structures called elytra that protect their body. We know from the fossil record that the most recent ancestor of all winged insects living today, including beetles, had two pairs of wings. Based on this information, we can say that the elytra of beetles and the front wings of other insects such as butterflies are...



Select one:

- a. Convergent structures
- b. Analogous structures
- c. Vestigial structures
- d. Recessive structures
- e. Homologous structures ✔

Your answer is correct.

The correct answer is: Homologous structures

Question **3**

Correct

Mark 1.00 out of 1.00

What are the three domains of life?

Select one:

- a. Eukarya, Protista, Prokaryota
- b. Chordata, Archaea, Bacteria
- c. Eukarya, Archaea, Bacteria ✔
- d. Bacteria, Archaea, Eumetazoa
- e. Prokaryota, Eukarya, Protista

Your answer is correct.

The correct answer is: Eukarya, Archaea, Bacteria

Question **4**

Correct

Mark 1.00 out of 1.00

In the Linnean classification, which taxa falls between the Family and the Class?

Select one:

- a. Genus
- b. Order ✔
- c. Phylum
- d. Kingdom
- e. Domain

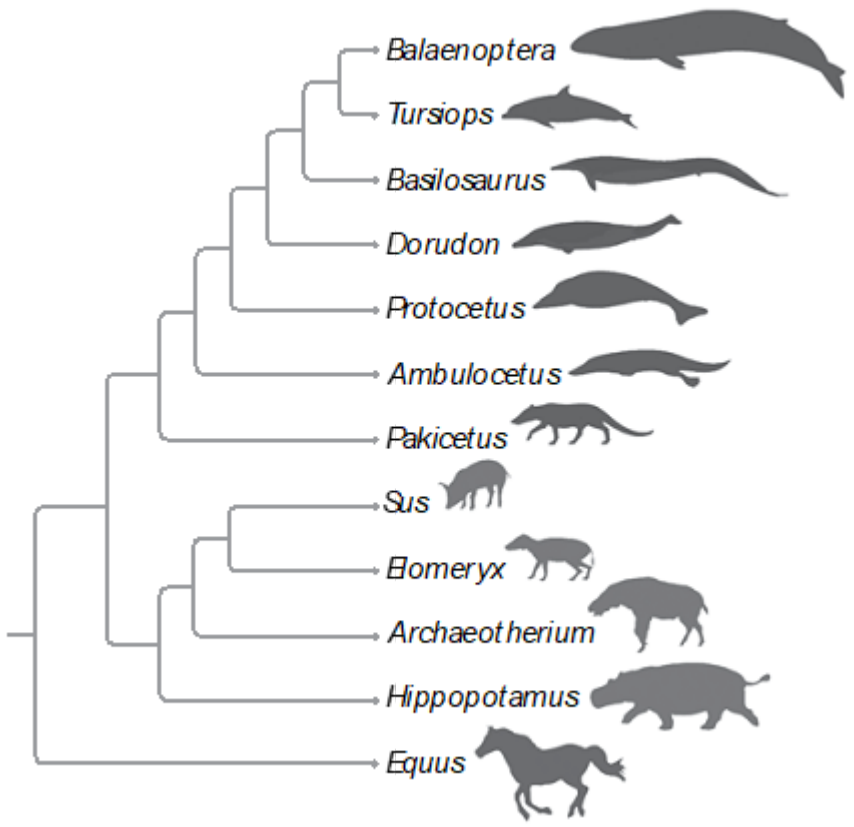
Your answer is correct.

The correct answer is: Order

Question **5**

Correct

Mark 1.00 out of 1.00



According to this phylogeny, which statement is true?

Select one:

- a. *Ambulocetus* is more closely related to *Protocetus* than to *Balaenoptera*
- b. *Equus* is more closely related to *Hippopotamus* than to *Pakicetus*.
- c. *Pakicetus* is more closely related to *Sus* than to *Durodon*
- d. *Balaenoptera* and *Basilosaurus* are equally related to *Durodon* ✔
- e. *Durodon, Basilosaurus*, and *Tursiops* form a monophyletic group.

Your answer is correct.

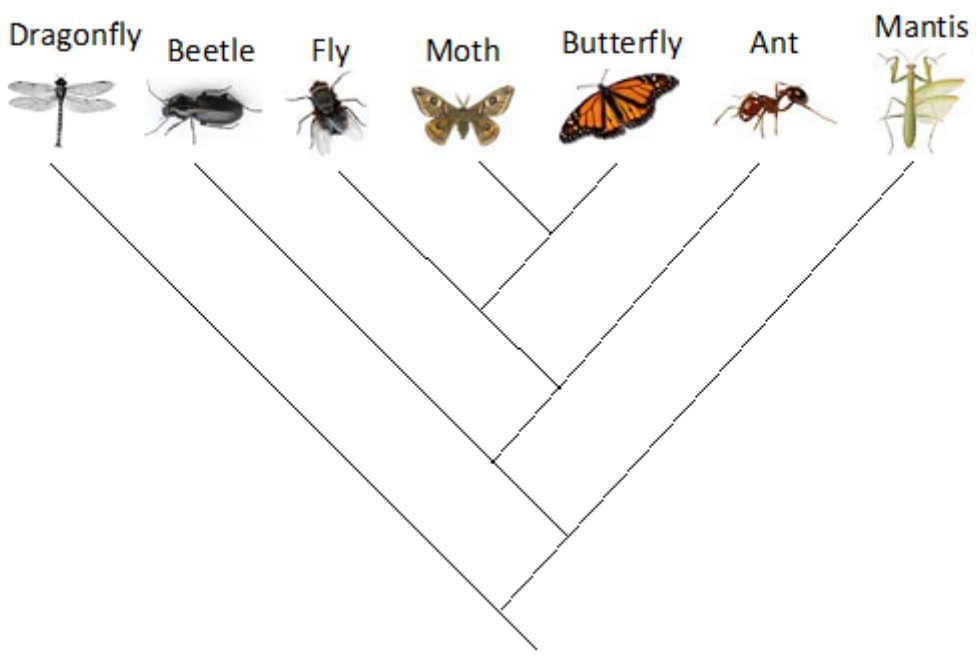
The correct answer is: *Balaenoptera* and *Basilosaurus* are equally related to *Durodon*

Question **6**

Correct

Mark 1.00 out of 1.00

Who is the most closely related to the butterfly?



Select one:

- a. Fly ✔
- b. Mantis
- c. Dragonfly
- d. Beetle
- e. Ant

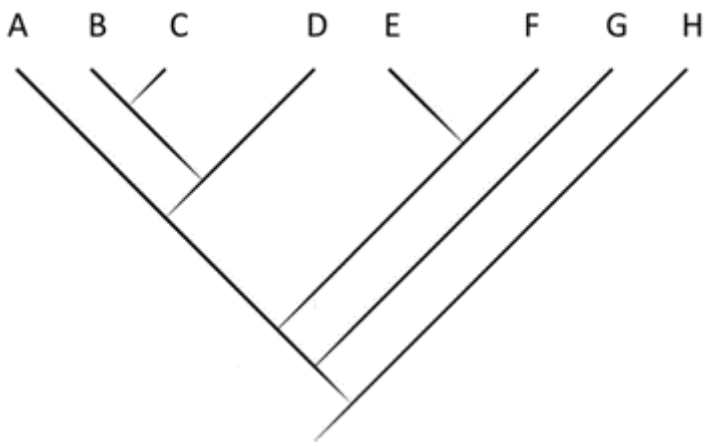
Your answer is correct.

The correct answer is: Fly

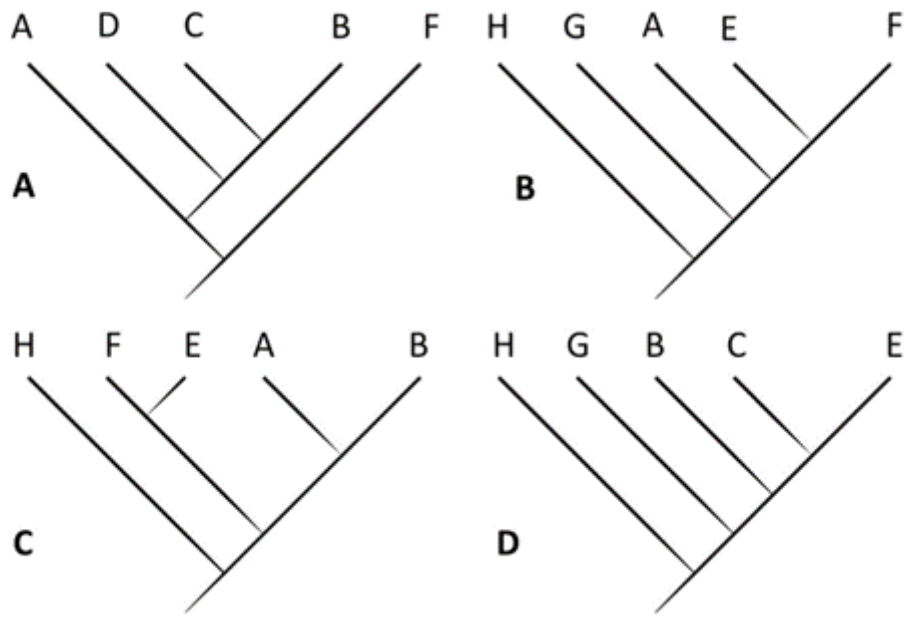
Question **7**

Correct

Mark 1.00 out of 1.00



The four trees below show a subset of the taxa from the larger tree. In which tree is the pattern of relatedness inconsistent with the larger tree.



Select one:

- a. A
- b. B
- c. C
- d. D ✔

Your answer is correct.

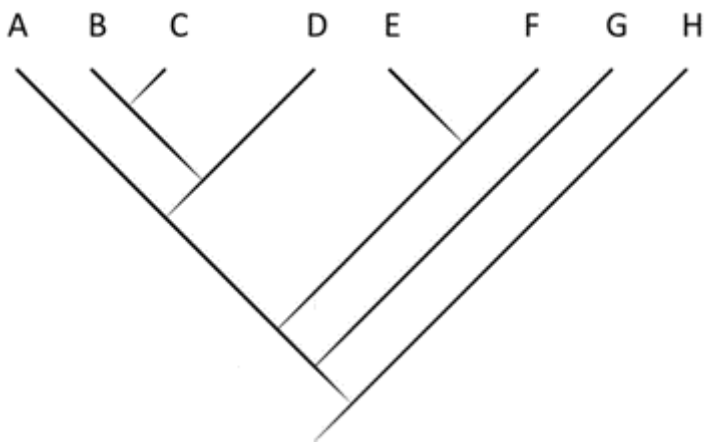
The correct answer is: D

Question **8**

Correct

Mark 1.00 out of 1.00

Based on the tree from Question 7, if taxa D and E were grouped together under the name DE-osaurs, the DE-osaurs would be considered a...



Select one:

- a. Paraphyletic group
- b. Pseudophyletic group
- c. Polyphyletic group ✔
- d. Monophyletic group

Your answer is correct.

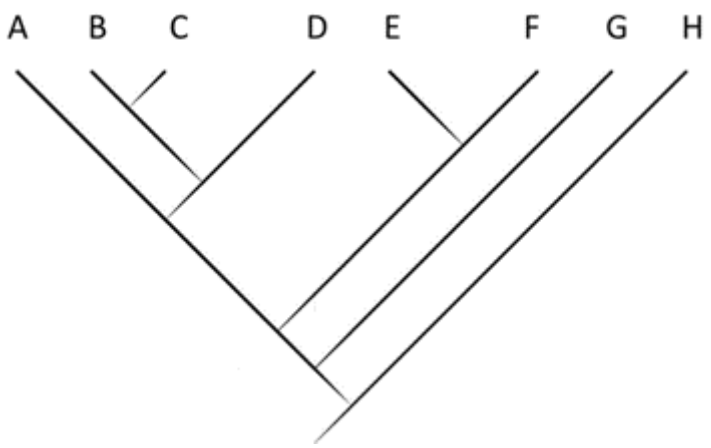
The correct answer is: Polyphyletic group

Question **9**

Correct

Mark 1.00 out of 1.00

Which group of taxa in the bigger tree does not form a clade?



Select one:

- a. B-C
- b. B-C-D
- c. A-B-C-D
- d. E-F-G-H ✔
- e. A-B-C-D-E-F

Your answer is correct.

The correct answer is: E-F-G-H

Question **10**

Correct

Mark 1.00 out of 1.00

In secondary endosymbiosis, _____ acquired its _____ from _____.

Select one:

- a. a eukaryote, plasitds, another eukaryote ✔
- b. a prokaryote, mitochondrion, another prokaryote
- c. a eukaryote, mitochondrion, a prokaryote
- d. a prokaryote, plastids, a eukaryote
- e. a prokaryote, plastids, another prokaryote

Your answer is correct.

The correct answer is: a eukaryote, plasitds, another eukaryote

Question **11**

Correct

Mark 1.00 out of 1.00

All protists are...

Select one:

- a. Unicellular
- b. Eukaryotic ✔
- c. Symbionts
- d. Monophyletic
- e. Mixotrophic

Your answer is correct.

The correct answer is: Eukaryotic

Question **12**

Correct

Mark 1.00 out of 1.00

Which group of organisms is responsible for the oxygen revolution?

Select one:

- a. Angiosperms
- b. Lichens
- c. Green algae
- d. Prokaryotes ✔
- e. Ferns

Your answer is correct.

The correct answer is: Prokaryotes

Question **13**

Correct

Mark 1.00 out of 1.00

Plants have a life cycle with alternating generations in which...

Select one:

- a. Spores produced by meiosis give rise to a diploid sporophyte
- b. Spores produced by meiosis give rise to a haploid gametophyte. ✔
- c. Spores produced by mitosis give rise to a diploid gametophyte.
- d. Spores produced by meiosis give rise to a haploid sporophyte.
- e. Spores produced by meiosis give rise to a diploid gametophyte

Your answer is correct.

The correct answer is: Spores produced by meiosis give rise to a haploid gametophyte.

Question **14**

Correct

Mark 1.00 out of 1.00

Which of the following statements is *not* a line of evidence supporting the endosymbiotic theory?

Select one:

- a. Mitochondria and plastids have their own circular DNA which is similar to bacterial DNA.
- b. Mitochondria and plastids reproduce independently of the rest of the cell.
- c. Mitochondria and plastids are separated from the rest of the cell by a membrane.
- d. Mitochondria and plastids can both live and reproduce outside of a cell. ✔
- e. All of the above are lines of evidence supporting the endosymbiotic theory.

Your answer is correct.

The correct answer is: Mitochondria and plastids can both live and reproduce outside of a cell.

Question **15**

Correct

Mark 1.00 out of 1.00

Methanogens are Archean's that derive their energy and carbon from inorganic hydrogen gas and gaseous CO_2, respectively. Methanogens are...

Select one:

- a. Photoheterotroph
- b. Chemoheterotroph
- c. Chemoautotroph ✔
- d. Chemophototroph
- e. Photoautotroph

Your answer is correct.

The correct answer is: Chemoautotroph

Question **16**

Correct

Mark 1.00 out of 1.00

A mycorrhiza is...

Select one:

- a. A parasitic relationship between a protist and a plant.
- b. A mutualistic symbiosis between a fungus and the roots of a plant. ✔
- c. A mutualistic symbiosis between an alga and a fungus.
- d. An endosymbiotic relationship between a prokaryote and eukaryote.
- e. A mutualistic symbiosis between a dinoflagellate (protist) and a reef building animal.

Your answer is correct.

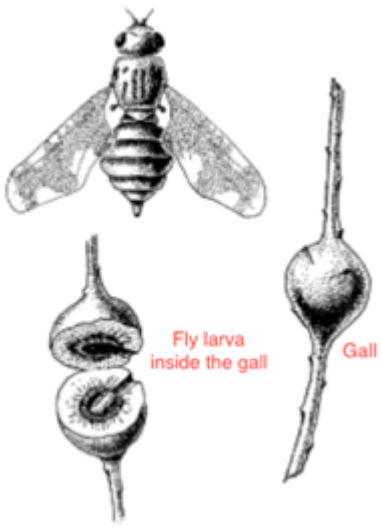
The correct answer is: A mutualistic symbiosis between a fungus and the roots of a plant.

Question **17**

Correct

Mark 1.00 out of 1.00

The tiny fly Eurosta solidaginis lays a single egg in the stem of a goldenrod plant. When the egg hatch, the fly larva feeds on the plant tissue. The feeding larva tricks the plants into building a thick ball of tissue called a gall. The galls provide food and protection to the fly larva. Researchers noted that fly larvae vary in the size of gall they induce in goldenrods. Some individuals induce larger galls than others. They also noted that the size of a gall affects the type of "enemies" it attracts. Small galls are more likely to attract parasitic wasps that lay their eggs inside the fly larva living inside the galls. This kills the fly larva. Larger galls are more likely to attract downy woodpeckers that peck a whole in the gall to eat the larva. This actual scenario is an example of...



Select one:

- a. Directional selection
- b. Artificial selection
- c. Stabilizing selection ✔
- d. Disruptive selection
- e. Balancing selection

Your answer is correct.

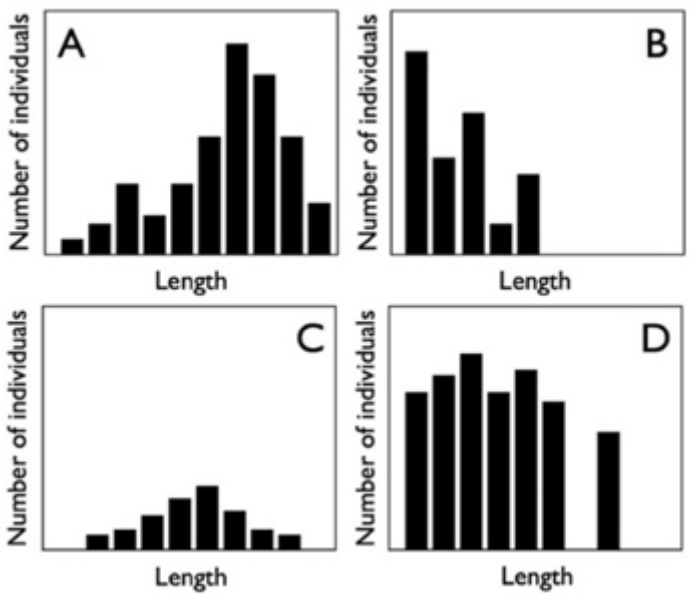
The correct answer is: Stabilizing selection

Question **18**

Correct

Mark 1.00 out of 1.00

Based on this figure, which population shows the least variation in body length?



Select one:

- a. A
- b. B ✔
- c. D
- d. D

Your answer is correct.

The correct answer is: B

Question **19**

Correct

Mark 1.00 out of 1.00

The adult size of the Antantic Cod (*Gadus morhua*) has been declining over the last 100 years. Fisheries scientists hypothesized that selection by fishing led the cod evolve a smaller adult size. What do scientists need to know to confidently conclude that selection by fishing has indeed caused the evolution of smaller adult size in Atlantic Cod?

Select one:

- a. Adult size is variable among individuals
- b. Under fishing pressure, smaller individuals have greater fitness than larger ones.
- c. Adult size is at least partly heritable.
- d. A, B and C ✔
- e. A and C only

Your answer is correct.

The correct answer is: A, B and C

Question **20**

Correct

Mark 1.00 out of 1.00

Which of the following mechanisms does *not* create, *nor* maintain the genetic variation selection can act on in the population?

Select one:

- a. Random fertilization
- b. Crossing over during meiosis
- c. Somatic mutations ✔
- d. Germ line mutations
- e. Balancing selection

Your answer is correct.

The correct answer is: Somatic mutations

Question **21**

Correct

Mark 1.00 out of 1.00

A population of prokaryotes can adapt to change in their environments much more rapidly than sexually reproducing eukaryotes can. Which of the following is *not* a reason for the greater evolutionary potential of prokaryotes compared to eukaryotes?

Select one:

- a. The number of mutations per generation during binary fission is much higher than in sexual reproduction. ✔
- b. Prokaryotes have faster generation time than eukaryotes so mutations can accumulate more rapidly in a population of prokaryotes than in a population of eukaryotes.
- c. Prokaryotes have typically have much greater population sizes than eukaryotes so, at the population level, more variation at any given locus will be present.
- d. Prokaryotes can obtain genes directly from their environment.
- e. Individual prokaryotes can obtain genes from other individuals from the same or other species.

Your answer is correct.

The correct answer is: The number of mutations per generation during binary fission is much higher than in sexual reproduction.

Question **22**

Correct

Mark 1.00 out of 1.00

In an extremely large population with only two alleles for a given locus, which allele will most likely be lost over time?

Select one:

- a. A dominant deleterious allele ✔
- b. A recessive deleterious allele.
- c. An allele conferring an advantage only in heterozygote individuals
- d. A dominant beneficial allele.
- e. All of the above

Your answer is correct.

The correct answer is: A dominant deleterious allele

Question **23**

Correct

Mark 1.00 out of 1.00

The New-Zealand Mud Snail (*Potamopyrgus antipodarum*) has two reproductive phenotypes: one that reproduces sexually and one that reproduces asexually (by cloning itself). Both phenotypes can live in the same lake but their relative abundance changes over time. Scientists found that the asexual phenotype reproduces faster than the sexual phenotype, but it is more vulnerable to parasitic infection by a parasite that castrates its snail host (true fact). When parasites are uncommon, the asexual phenotype multiplies faster than the sexual phenotype and becomes the most common phenotype. As the asexual phenotype increases in abundance relative to the sexual phenotype, the parasite population increases and eventually reduce the average fitness of the asexual phenotype below that of the sexual phenotype. The sexual phenotype then increases in abundance and becomes more common than the asexual phenotype. As the sexual phenotype increases in abundance, the population of parasites declines. This is an example of...

Select one:

- a. Sexual selection
- b. Disruptive selection
- c. Directional selection
- d. Stabilizing selection
- e. Frequency-dependent selection ✔

Your answer is correct.

The correct answer is: Frequency-dependent selection

Question **24**

Correct

Mark 1.00 out of 1.00

In the previous question, which evolutionary explanation is consistent with the selective advantage experienced by sexual phenotype when parasites are common?

Select one:

- a. The sexually reproducing phenotype grows larger than the asexual phenotype.
- b. The sexually reproducing phenotype gains resistant alleles through conjugation and transduction.
- c. Sexual reproduction creates new, and thus rare, combinations of alleles conferring resistance to the parasite. ✔
- d. The sexually reproducing phenotype lays more eggs than the asexual phenotype.
- e. Sexual reproduction leads to a higher mutation rate than asexual reproduction

Your answer is correct.

The correct answer is: Sexual reproduction creates new, and thus rare, combinations of alleles conferring resistance to the parasite.

Question **25**

Correct

Mark 1.00 out of 1.00

Tay-Sachs disease is a recessive genetic disease. Individuals with this disease rarely survive past the age of four. In the general population, approximately 1 person in 300 carries the allele for this disease. However, in some populations, including the Irish Americans, the Ashkenazi Jews and the Cajuns from Louisiana, the proportion of Tay-Sachs carriers is much higher (1 in 27 to 1 in 50) than in other populations. Which evolutionary scenario can be predicted to produce a high frequency of Tay-Sachs disease in these populations?

Select one:

- a. These populations experienced stabilizing selection.
- b. These populations experienced disruptive selection.
- c. The Tay-Sachs allele is advantageous at the heterozygote rate.
- d. All three populations descend from a small number of settlers. ✔
- e. These populations have higher than average mutation rates.

Your answer is correct.

The correct answer is: All three populations descend from a small number of settlers.

Question **26**

Correct

Mark 1.00 out of 1.00

Under which circumstances will the genotype frequency for a given locus be at Hardy-Weinberg equilibrium?

Select one:

- a. When genetic drift is not affecting allele frequencies.
- b. When selection is not acting on all of the genotypes.
- c. When individuals are not entering or leaving the population.
- d. When mutations are not occurring at this locus
- e. Under all of the above circumstances simultaneously. ✔

Your answer is correct.

The correct answer is: Under all of the above circumstances simultaneously.

Question **27**

Correct

Mark 1.00 out of 1.00

A small island is home to a population of land snails. This population was founded by 10 individuals that were released by a tourist and it has been isolated from the large mainland population ever since. The island population reached 1000 individuals after several generations, and then stayed near this size through time. If you were to compare the genetic make-up of the mainland and the isolated island populations after a few generations what should you observe?

Select one:

- a. Evidence of genetic drift but not evolution in the island population.
- b. Fewer alleles in the island population than in the mainland population. ✔
- c. Relatively fewer heterozygotes in the mainland population than in the island population
- d. More recessive alleles in the island population.
- e. Higher mutation rate (mutation per base pair per generation) in the island population than in the mainland population.

Your answer is correct.

The correct answer is: Fewer alleles in the island population than in the mainland population.

Question **28**

Correct

Mark 1.00 out of 1.00

For questions 28, 29 and 30 refer to the following statement: In a population of lab-bred flies, a locus affecting eye colour has 2 alleles. The R allele produces regular regular coloured eye pigment, while the r allele produces red pigment. Heterozygote individuals (Rr) have pink eyes. In a population of 150 flies, 15 flies have red eyes, and 45 have pink eyes.

What is the observed frequency of flies with regular coloured eyes?

Select one:

- a. 0.6 ✔
- b. 0.4
- c. 0.5
- d. 0.2
- e. 0.1

Your answer is correct.

The correct answer is: 0.6

Question **29**

Correct

Mark 1.00 out of 1.00

In a population of lab-bred flies, a locus affecting eye color has 2 alleles. The R allele produces regular colored eye pigment, while the r allele produces red pigment. Heterozygote individuals (Rr) have pink eyes. In a population of 150 flies, 15 flies have red eyes, and 45 have pink eyes.

What is the frequency of the r allele?

Select one:

- a. 0.1
- b. 0.01
- c. 0.25 ✔
- d. 0.32
- e. 0.15

Your answer is correct.

The correct answer is: 0.25

Question **30**

Correct

Mark 1.00 out of 1.00

In a population of lab-bred flies, a locus affecting eye color has 2 alleles. The R allele produces regular colored eye pigment, while the r allele produces red pigment. Heterozygote individuals (Rr) have pink eyes. In a population of 150 flies, 15 flies have red eyes, and 45 have pink eyes.

If the locus of interest is at Hardy-Weinberg equilibrium, what should the frequency of the rr genotype be?

Select one:

- a. 0.56
- b. 0.16
- c. 0.1
- d. 0.065 ✔
- e. 0.01

Your answer is correct.

The correct answer is: 0.065

Question **31**

Correct

Mark 1.00 out of 1.00

The table below shows the expected (under Hardy-Weinberg Equilibrium) and actual allele frequencies for a locus with two alleles (C and T) in 5 populations. In which population are the heterozygotes having a higher fitness than the homozygotes?

		Genotypes		
		CC	**CT**	**TT**
Population A	Observed Freq	0.25	0.50	0.25
	Expected Freq	0.25	0.50	0.25
Population B	Observed Freq	0.08	0.68	0.24
	Expected Freq	0.18	0.49	0.34
Population C	Observed Freq	0.30	0.25	0.45
	Expected Freq	0.18	0.49	0.33
Population D	Observed Freq	0.70	0.01	0.29
	Expected Freq	0.50	0.42	0.09
Population E	Observed Freq	0.80	0.32	0.04
	Expected Freq	0.80	0.32	0.04

Select one:

- a. Population A
- b. Population B ✔
- c. Population C
- d. Population D
- e. Population E

Your answer is correct.

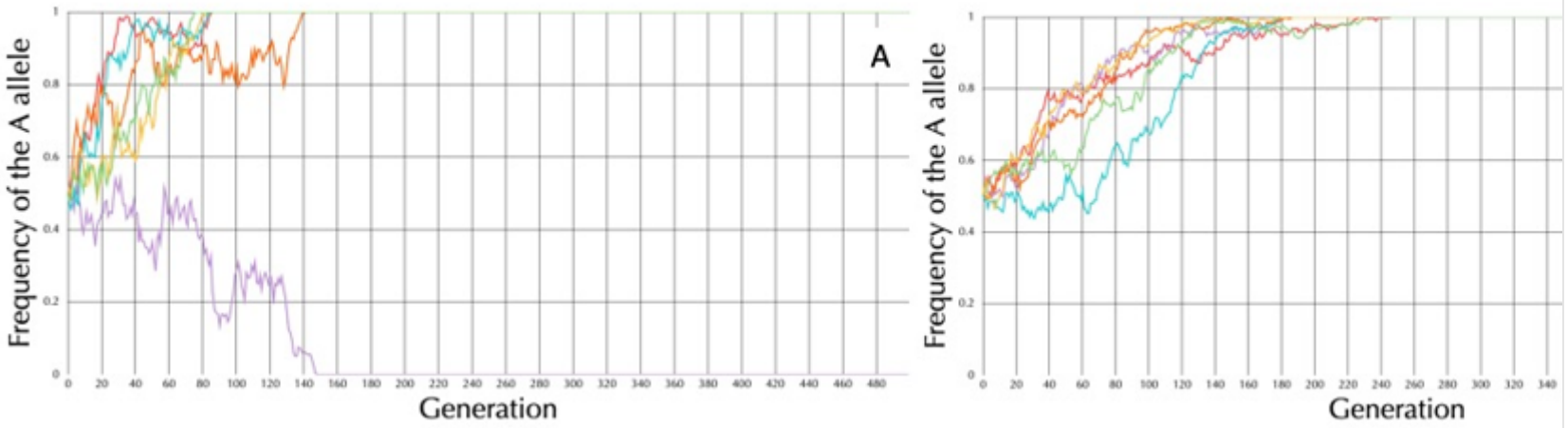
The correct answer is: Population B

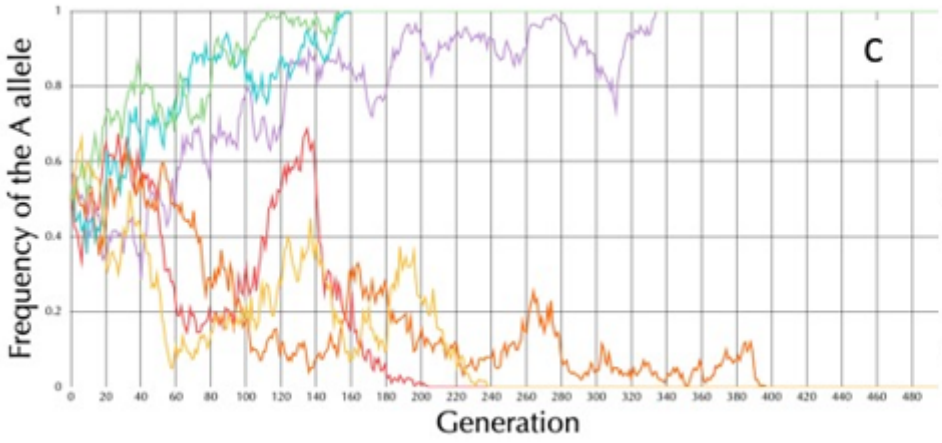
Question **32**

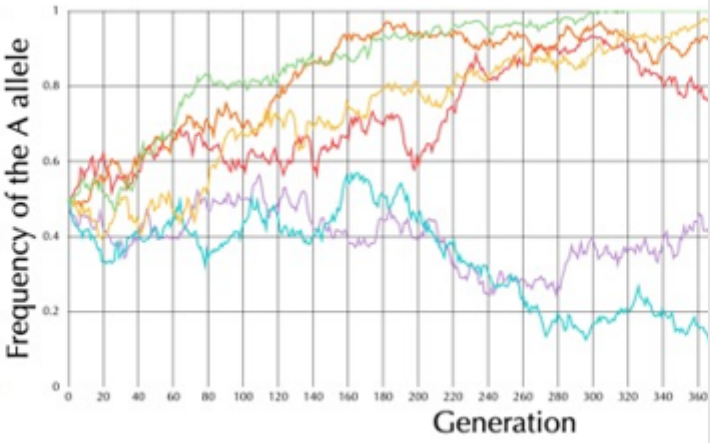
Correct

Mark 1.00 out of 1.00

Each graph below shows the frequency of the A allele in six simulated populations over 500 generations (each line in a graph is a simulation). Each of the six simulations within a graph were done with the exact same settings of relative fitness among the genotypes and the population size. However, these settings differed between the four graphs. Which graph shows a situation in which the effect of selection is the highest relative to effect the drift?







Select one:

- a. A
- b. B ✔
- c. C
- d. D

Your answer is correct.

The correct answer is: B

◄ Quiz II - Lectures 2 to 5

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